

the total weight percent of the matrix polymers equaling 100 percent.

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5 In a medical procedure the device will be shaped to accommodate the patients individual anatomy or the particular surgical requirements. The medical device would be heated preferably in a liquid media until the medical device provides a visible cue that it may be shaped (without imparting undue stress to the medical device). In one preferred embodiment of the present invention when heated the absorbable polymer matrices under goes a reversible visual change when a substantial amount of the dispersed polymer phase becomes clear by melting. The scattering sites when transparent no longer scatter light and the absorbable polymeric matrix will appear clear as long as the dispersed phase remains above its melting point. For the absorbable polymeric matrix described above the surgeon would heat the matrix to a temperature from about 40°C to about 65°C until it becomes nearly transparent. While the matrix appears clear the surgeon will be able to safely shape the device.

25 The polymers of the present invention will typically be synthesized in a ring opening polymerization. That is, the aliphatic lactone monomers lactide, glycolide, ϵ -caprolactone, p-dioxanone, and trimethylene carbonate are polymerized in the presence of an organometallic catalyst and an initiator at elevated temperatures. The organometallic catalyst is preferably tin based, e.g.,

stannous octoate, and is present in the monomer mixture at a molar ratio of monomer to catalyst ranging from about 10,000/1 to about 100,000/1. The initiator is typically an alkanol (including diols and polyols), a glycol, a hydroxyacid, or an amine, and is present in the monomer mixture at a molar ratio of monomer to initiator ranging from about 100/1 to about 5000/1. The polymerization is typically carried out at a temperature range from about 80°C to about 240°C, preferably from about 100°C to about 220°C, until the desired molecular weight and viscosity are achieved.

The polymer blends of the present invention are manufactured in a conventional manner, preferably in the following manner. The homopolymers and copolymers, prepared as described above, are individually charged into a conventional mixing vessel or reactor vessel having a conventional mixing device mounted therein, such as an impeller or equivalents thereof. Then, the polymers and copolymers are mixed at a temperature of about 100°C to about 230°C, more preferably from about 160°C to about 200°C, for about 5 to about 90 minutes, more preferably for about 10 to about 45 minutes, until a uniformly dispersed polymer blend is obtained. Then, the polymer blend is further processed by removing it from the mixing device, cooling to room temperature, grinding, and drying under pressures below atmospheric at elevated temperatures for a period of time using conventional apparatuses and processes.

Additionally, a minor amount (less than 5, preferably less than 3 weight percent weight percent) of additional

lactone monomers selected from the group consisting of
1,3-dioxan-2-one, p-dioxanone, delta-valerolactone,
beta-butyrolactone, epsilon-decalactone, 2,5-
diketomorpholine, pivalolactone, alpha, alpha-
5 diethylpropiolactone, ethylene carbonate, ethylene
oxalate, 3-methyl-1,4-dioxane-2,5-dione, 3,3-diethyl-
1,4-dioxan-2,5-dione, gamma-butyrolactone, 1,4-dioxepan-
2-one, 1,5-dioxepan-2-one, 6,6-dimethyl-dioxepan-2-one,
6,8-dioxabicyclooctane-7-one and combinations of two or
10 more thereof may be added.

Under the above described conditions, the polymers and
blends composed of glycolide, epsilon-caprolactone, p-
dioxanone, lactide and trimethylene carbonate will
15 typically have a weight average molecular weight of
about 20,000 grams per mole to about 300,000 grams per
mole, more typically about 40,000 grams per mole to
about 200,000 grams per mole, and preferably about
60,000 grams per mole to about 150,000 grams per mole.
20 These molecular weights provide an inherent viscosity
between about 0.5 to about 4.0 deciliters per gram
(dL/g), more typically about 0.7 to about 3.5 dL/g, and
most preferably about 1.0 to about 3.0 dL/g as measured
in a 0.1 g/dL solution of hexafluoroisopropanol (HFIP)
25 at 25°C. Also, it should be noted that under the above
described conditions, the residual monomer content would
be less than about 5 weight percent.

Articles such as medical devices are molded from the
30 polymers and blends of the present invention by use of
various injection and extrusion molding equipment